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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/514,413

11/15/2004

Nick Campbell

71109-014

6822

20277 7590 06/09/2009
MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096

EXAMINER

SHAH, PARAS D

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

06/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/514,413	Applicant(s) CAMPBELL ET AL.	
	Examiner PARAS SHAH	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7-9,11,13-15,17,23-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1,2,4,8,9,11,14,15,17 and 23-26 is/are allowed.
- 6) ☒ Claim(s) 7 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to the Amendments and Arguments filed on 03/26/2009. Claims 1,2,4,7-9,11,13-15,17, and 23-26 are pending and have been examined, with claims 3, 10, 16 , 20-22 being cancelled and claims 24-26 being newly added. The Applicants' amendment and remarks have been carefully considered, but they are not persuasive and do not place the claims in condition for allowance.

Accordingly this action has been made FINAL.

2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

Response to Amendments and Arguments

3. Applicant's arguments (pages 15-22) filed on 03/26/2009 with regard to claims 7 and 13 have been fully considered but they are not persuasive for the reasons mentioned below.

With respect to claims 7 and 13, the Applicants argue that Mizuno does not disclose a "distribution of local variance of magnitude of delta cepstrum of said speech waveform on the time axis." Further, the Applicants argue that Mizuno's delta cepstrum represents magnitude of the spectrum variation not the "local variance" The Examiner respectfully disagrees with this assertion. In Mizuno col. 6, lines 28-60, the delta cepstrum $A(t)$ is calculated for each LPC cepstrum with the use of equation 4, which corresponds to the Applicant's calculation magnitude of delta cepstrum The "distribution of local variance" is

also taught in Mizuno. In col. 6, lines 41-60, the $D(t)$ is calculated for each delta spectrum over an analysis frame. Although the applicants are correct in stating that the dynamic measure represents spectrum variation, such variation is a local variation since the dynamic measures are calculated for a specified time interval. The measures are then used to determine changes in the measures based on a threshold where more pronounced peaks in an interval suggest a speech period. The Applicants have not provided an explicit definition of what the "local variance" . Rather the Published Specification describes in paragraph [0080] indicates how reliable the estimate is. Mizuno similarly performs this reliability measurement by the counting of peaks and comparing these peaks to a threshold, to determine where speech is likely to have been encountered (where more peaks generate a reliable speech presence).

Claim Objections

4. Claims 1 are objected to because of the following informalities: "the sonorant energy calculating unit" in the 3rd paragraph of the limitation should be changed to "the acoustic/prosodic analysis unit". Further, in the last paragraph of the limitation line2, the following should be inserted, "said distribution of cepstral distance on the time axis...." Appropriate correction is required.
5. Claims 8 and 14 recited similar limitations as in claim 1, where the method and machine readable medium claims are claimed and should be corrected in the manner described above.

6. Claims 8 and 13 are objected to because of the following informalities: "machine readable medium" should be changed to "recording medium" as defined in the Published Specification, paragraph [0057]. Further, the limitation of "once read by the machine, causing the machine ..." should be changed to "when executed by the processor, causes the processor..." Appropriate correction is required.

7. Claim 14 is objected to because of the following informalities: The units that perform the calculating should be inserted in order to distinguish between the two processes that are being performed. For example, the acoustic/prosodic analysis unit for the first paragraph, and the cepstral analysis unit for the second paragraph. Appropriate correction is required.

8. Claims dependent upon 14 should be corrected in a similar manner as described above.

9. Claims 4, 11, and 17 are objected to because of the following informalities: The claims recite the limitation of "the range extracted by said acoustic/prosodic analysis unit" and "the range of which change in speech waveform is estimated by said cepstral analysis unit." The claims lacks antecedent basis in the independent claims and should be changed to "a range from the first portion" and "a range from the second portion." Appropriate correction is required.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer :(" System for Automatic Formant Analysis of Voiced Speech) in view of Mizuno (US 5,732,392).

As to claims 7 and 13, Schafer teaches estimation of formant frequency (see page 641, left column, last paragraph before section C. , where the spectral envelope is computer, as a function of frequency and formants are estimated, as shown in Figure 11) and the calculation of a distribution (see Figure 11a-11c, where calculation of formants is shown) based on the estimated value of formant frequency (see Figure 13a, where the formant as a function of time is shown).

However, Schafer does not specifically teach the use of linear prediction for estimating formants. The Examiner however points out that the use of linear prediction for estimating formants is well known in the art (See paper by Mccandless, "an algorithm for automatic formant extraction using liner prediction spectra", 1984).

However, Schafer does not specifically teach the second calculating means for calculating, based on output from said linear predicting means, distribution on the time axis of local variance of spectral change on the time axis of said speech waveform and means for estimating, based on the distribution of non reliability of based on the estimated value of formant calculated by said first

calculating means and the distribution of variance of local spectral change in said speech waveform calculated by said second calculating means, a portion of said speech waveform in which a change in said speech waveform is well controlled by said source.

Mizuno does teach second calculating means for calculating, based on output from said linear predicting means (see col. 6, lines 28-29, LPC cepstrum is used as a feature vector), distribution on the time axis of local variance of spectral change on the time axis of said speech waveform (see col. 6, lines 29-35, delta cepstrum is obtained from LPC cepstrums as a function of time, $A(t)$); and

means for estimating, based both on said distribution on the time axis based on the estimated value of formant calculated by said first calculating means (see col. 6, lines 29-30, the speech period determination is based on the LPC cepstrum that is input) and the distribution on the time axis of variance of spectral change in said speech waveform calculated by said second calculating means (see col. 6, lines 29-35, delta cepstrum is computed), a range in which change in the speech waveform is well controlled by said source (see col. 6, lines 42-60, number of peaks that exceed a threshold is determined and compared with the sum total of a threshold to determine the speech period.

It would have been obvious to one of ordinary skilled in the art at the time the invention as made to have modified the separation of speech signal into quasi-syllables as taught by Schafer with the use of a second calculating means

and determination of a range as taught by Mizuno for the purpose of detecting speech period in a high-noise environment (see Mizuno col. 2, lines 18-21).

Allowable Subject Matter

12. Claims 1, 2, 4, 8, 9, 11, 14, 15, 17, 23-25, and 26 are allowed.
13. The following is a statement of reasons for the indication of allowable subject matter: None of the cited references either alone or in combination thereof teach the combination of elements as recited claim where for detection of syllabic regions of speech two calculations are performed. These include the acoustic/prosodic analysis unit and the cepstral analysis unit, where the cepstral unit is further defined to include a linear prediction analysis unit, cepstral calculating unit, interframe variance calculating unit, and a reliability center candidate output unit. The pseudo-syllabic center extracting unit which determines and uses information from both outputs to determine a specific feature. For these mentioned reasons the claims are allowable over the cited prior art.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kosaka (US 5,893,058) is cited to disclose phoneme detection. Abe (US 5,940,794) is cited to disclose boundary estimation for speech recognition. Fany (US 6,535,851) is cited to disclose segmentation approach for speech recognition. Suzuki et al. (US 2006/0053003) is cited to disclose acoustic interval detection.

The NPL document by Mori et al. ("Automatic Detection and Description of Syllabic Features in Continuous Speech") is cited to disclose detecting syllabic features from prosodic and spectral features. Medress et al. ("An Automatic Word Spotting System for conversational Speech") is cited to disclose word spotting by using acoustic and phonetic analysis. Bagshaw ("Automatic Prosodic Analysis for computer aided Pronunciation teaching") is cited to disclose prosodic analysis of speech. Buckow et al. ("Dovetailing of Acoustics and Prosody in Spontaneous Speech Recognition") is cited to disclose boundary detection of speech syllables.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571)272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R Hudspeth/
Supervisory Patent Examiner, Art Unit 2626

/Paras Shah/
Examiner, Art Unit 2626

06/03/2009